

# (12) UK Patent Application (19) GB (11) 2 026 084 A

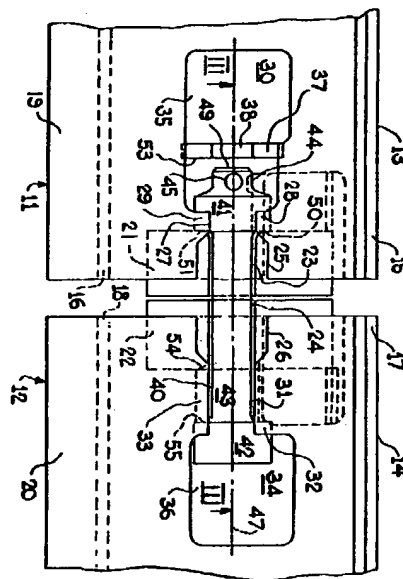
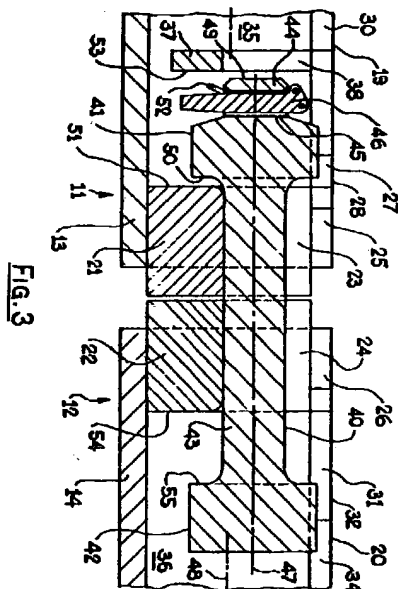
(21) Application No 7923109  
 (22) Date of filing  
 3 Jul 1979  
 (23) Claims filed  
 3 Jul 1979  
 (30) Priority data  
 (31) 17154/78  
 (32) 29 Apr 1978  
 (33) United Kingdom (GB)  
 (43) Application published  
 30 Jan 1980  
 (51) INT CL<sup>3</sup> F16B 21/10  
 (52) Domestic classification  
 E2A CSF  
 (56) Documents cited  
 GB 1543365  
 GB 1483595  
 GB 947541  
 GB 914619  
 GB 595968  
 (58) Field of search  
 B7T  
 E2A  
 F2H  
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## (54) Structural connection

(57) This invention relates to a structural connection intended for connecting together two adjacent structural members and comprising a connector 40, stop means 46 which can be fitted to the connector, and receiving means 23-26, 30, 34, 38 which form part of or are carried by adjacent end portions of the structural members and which include abutment means 53. The connector and the receiving means are so shaped that the connector can be fitted into the receiving

means from a side of the structural members. When the connector is in place within the receiving means, the stop means can be fitted to the connector in such position with respect thereto as to be co-operable with the abutment means to limit relative axial movement of the connector and receiving means to provide security of the connection.



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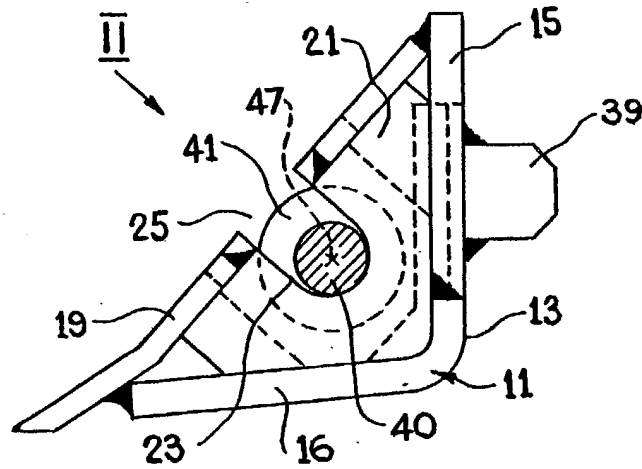


FIG. 1

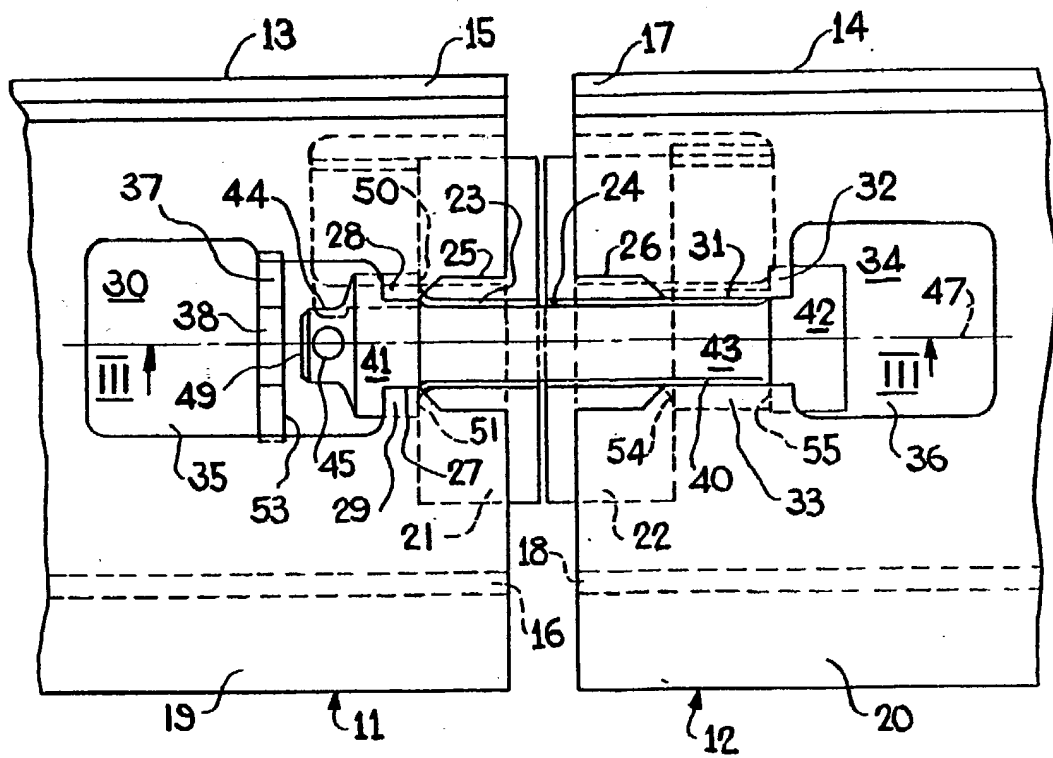
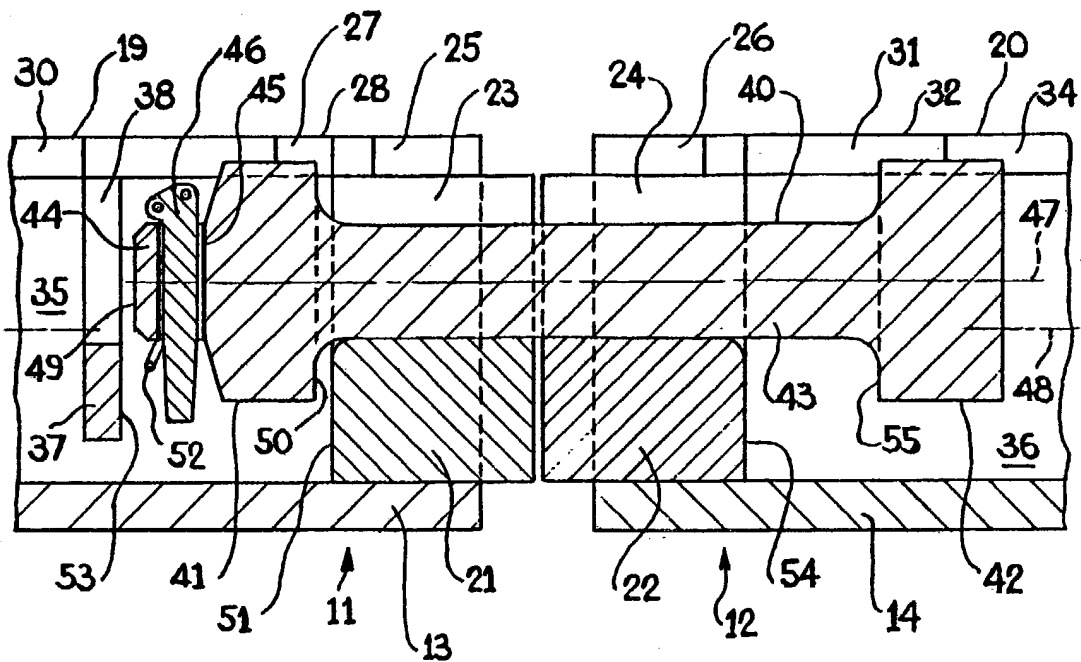


FIG. 2

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## SPECIFICATION

## Structural connection

- 5 This invention relates to a structural connection for connecting together two adjacent structural members, for example, adjacent ramp plates associated with a scraper-chain conveyor used in mineral-mining operations.
- 10 Hitherto difficulty has been experienced in providing a structural connection, for such an application, which is capable of affording ready release and ready re-engagement and yet which provides such freedom of relative movement of the structural members as will permit snaking of the members to take place, for example, to follow any snaking movement of conveyor pans with which said members are associated. Structural connections hitherto
- 20 produced with these aims in view have proved to be somewhat complex in construction and in consequence costly.

The invention as claimed is intended to provide a remedy. It solves the problem of

25 how to design an improved structural connection which achieves these aims.

- According to this invention a structural connection, for connecting together two adjacent structural members, comprises a connector, stop means which can be fitted to said connector, and receiving means which form part of or are carried by adjacent end portions of said structural members and which include abutment means, said connector and said
- 30 receiving means being so shaped that the connector can be fitted into said receiving means from a side of said structural members and when said connector is in place within the receiving means said stop means can be fitted to the connector in such position with respect
- 40 thereto as to be co-operable with said abutment means to limit relative axial movement of said connector and said receiving means to provide security of the connection.

- 45 The advantages offered by the invention are mainly that the structural connection provided is relatively compact and straightforward in its construction, as well as being relatively inexpensive to produce.

- 50 One way of carrying out the invention is described in detail below with reference to drawings which illustrate only one specific embodiment, in which:—

*Figure 1* is an end elevation of a ramp plate suitable for fitment to one side of a pan of a scraper-chain conveyor and forming one of two adjacent structural members,

*Figure 2* is a view taken in the direction of the arrow II on Fig. 1 and showing the adjacent end portions of two ramp plates, and,

*Figure 3* is an enlarged cross-section taken along the line III-III on Fig. 2.

Referring to the drawings, two adjacent and

65 substantially in-line ramp plates 11 and 12

respectively include members 13 and 14, each of which in cross-section has two limbs 15, 16; 17, 18 set at approximately 95 degrees. Each ramp plate includes an inclined plate 19, 20 welded to the respective limbs, the cross-sectional shape of the inclined plate 19 and the manner in which it is welded to the limbs 15, 16 being shown in Fig. 1.

A block 21, 22, generally of triangular cross-section, is secured by welding at each adjacent end of the two ramp plates 11, 12, being confined between the members 15, 16; 17, 18 and the plate 19, 20 and projecting somewhat from the respective plates 11, 12, as shown in Figs. 2 and 3. Each block has a slot 23, 24 of U-shape in cross-section which opens into a respective slot 25, 26 provided in the respective inclined plate 19, 20. The slots 25, 26 open to the respective ends of the plates 19, 20, being welded along their edges to the respective blocks 21, 22 as shown.

To the left in Fig. 2 of its welded edge portions the slot 25 is reduced in width at 27 to the width dimension of the slot 23, so that connector retention portions 28, 29 of the plate 19 flank this portion of the slot. To the left of this portion the slot 25 opens into a relatively large aperture 30 of generally rectangular shape in the plate 19.

To the right in Fig. 2 of its welded edge portions the slot 26 is reduced in width at 31 to the width dimension of the slot 24, so that connector retention portions 32, 33 of the plate 20 flank this portion of the slot. To the right of this portion the slot 26 opens into a relatively large aperture 34 of generally rectangular shape in the plate 20.

The apertures 30 and 34 open into respective spaces 35 and 36 of generally triangular cross-section bounded by the respective inclined plates and the limbs of members 13 and 14. The space 35 houses abutment means in the form of a plate 37, welded therein, having a slot 38 which is of U-shaped cross-section and which opens to the aperture 30 and thus to the exterior of the ramp plate 11.

The ramp plates 11 and 12 are secured by bolts (not shown) to the pans of a scraper chain conveyor (also not shown) with which the ramp plates are associated.

Location blocks, as at 39 in Fig. 1, are provided at intervals along the lengths of the limbs 15 and 17. The purpose of these blocks is to take the shear load between the ramp plates and the pans if the bolts start to work loose.

The slots 23, 24 of the blocks 21, 22, the slots 25, 26, the apertures 30, 34 and the slot 38 form receiving means for a connector 40 provided for connecting the adjacent ramp plates 11 and 12 together.

The connector is of dumb-bell shape, having two enlarged end portions 41 and 42 and

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a central stem portion 43, designed for ready fitment into the receiving means.

At its left-hand end in Figs. 2 and 3 the connector is provided with an extension portion 44 having a diametral aperture 45 therein for receiving a linch-pin 46. The diameter of the extension portion is slightly less than the width of the slot 38, while the diameter of the stem portion 43 of the connector 40 is slightly less than the width of the slots 23, 24 and the reduced width at 27 and 31 of the slots 25 and 26.

As shown in Figs. 2 and 3, the portion 27 of reduced width has a length which is substantially less than the axial length of the enlarged end portion 41 of the connector.

In order to connect the two ramp plates 11 and 12 together they are placed with the outer end faces of the adjacent blocks 21 and 22 close together as shown in Figs. 2 and 3. The connector 40 is fitted into the receiving means by firstly holding it with its longitudinal axis 47 at a substantial angle to the lengthwise axis 48 of the ramp plates and then entering the enlarged end portion 42 into the aperture 34, part of the stem portion 43 being thereby entered into the portion 31 of reduced width of the slot 26. Sliding movement of the connector, still at said angle or substantially so, to the left in Figs. 2 and 3 is then effected so that the enlarged end portion 42 is positioned beneath the retention portions 32, 33. This movement, lengthwise along the ramp plates 11 and 12, is continued until the connector reaches a position in which the other enlarged end portion 41 thereof is disposed wholly to the left of the retention portions 28, 29, whereupon the connector can be swung inwardly towards the axis 48 about its right-hand end so that the end portion 41 moves into the aperture 30 and the extension portion 44 is received by the slot 38 of the plate 37. When the connector is in place with the stem portion 43 thereof seated in the U-shaped slots 23 and 24, the longitudinal axis 47 of the connector is parallel to the axis 48.

The connector 40 is now moved axially to the right in Figs. 2 and 3 to the position in which it is shown in those figures so that both end portions 41 and 42 are in part disposed in registry with the retention portions 28, 29; 32, 33. The reduced width dimension of the portions 27 and 31 of the slots 25 and 26 is, as shown, less than the diameter of the end portions 41 and 42, so that the connector is retained from escaping in the direction transversely with respect to the ramp plates 11 and 12. The left-hand end face 49 of the portion 44 of the connector is axially-spaced from the plate 37, and the annular right-hand face 50 of the portion 41 is in contact, or nearly in contact, with the inner end face 51 of the block 21. In this position the connector 65 limits relative vertical movement of the ramp

plates.

In order to limit relative axial movement of the connector and the ramp plate 11 and thus to provide security of the connection, the linch-pin 46 is now fitted into the aperture 45, the spring clip 52 of the linch-pin being clipped over the end of the extension portion 44, as shown in Fig. 3. The linch-pin acts as stop means which is co-operable with the right-hand face 53 of the plate 37 to limit axial movement of the connector to the left in Figs. 2 and 3, while movement of the connector to the right is limited by co-operation of the annular face 50 with the face 51 of the block 21.

Snaking of the ramp plates 11 and 12 in a horizontal, or substantially horizontal, plane to follow snaking of the pans of the associated conveyor is permitted partly by the limited freedom of axial movement so afforded at the end portion 41 of the connector and partly by freedom of axial movement provided between the connector 40 and the ramp plate 12 which is limited by engagement of the inner end face 54 of the block 22 with the annular left-hand face 55 of the end portion 42 of the connector.

Although only one structural connection has been described above with reference to the drawings, in a mining installation a series of ramp plates would, in practice, be used in association with a scraper-chain conveyor running along the mineral face, one such structural connection being provided at the adjacent ends of each adjacent pair of ramp plates.

Although in the embodiment above-described with reference to the drawings the structural members comprise ramp plates, in other embodiments the structural members may instead comprise spill plates suitable for attachment to the pans of a scraper-chain conveyor or, alternatively, may be the pans of a scraper-chain conveyor themselves.

Again, although in the embodiment above-described with reference to the drawings the stop means comprises a linch-pin, in other embodiments other forms of pin may be used, for example, a spring pin or a taper pin or, alternatively, the stop means may comprise any component other than a pin which is adapted so as to be suitable to serve the same purpose.

Further, although in the embodiment above-described with reference to the drawings the end faces 51 and 54 of the blocks 21 and 22 are each set at right-angles to the lengthwise axis of the ramp plates, in other embodiments the blocks may have end faces 51 and 54 which are disposed at such an angle to the lengthwise axis of the ramp plates, that when the ramp plates are in their fully articulated position these faces are parallel the one to the other. In this way the annular faces 50 and 55 of the connector can then be respectively

in complete engagement with the faces 51 and 54, resulting in reduced bending loads in the connector.

- Finally, although in the embodiment above-described with reference to the drawings the connector is of circular cross-section, in other embodiments the connector may be of any other suitable cross-section, for example, square or rectangular, the receiving means being then so correspondingly shaped in cross-section that the connector is non-rotatable about its longitudinal axis when retained in the receiving means.

## 15 CLAIMS

1. A structural connection, for connecting together two adjacent structural members, comprising a connector, stop means which can be fitted to said connector, and receiving means which form part of or are carried by adjacent end portions of said structural members and which include abutment means, said connector and said receiving means being so shaped that the connector can be fitted into said receiving means from a side of said structural members and when said connector is in place within the receiving means said stop means can be fitted to the connector in such position with respect thereto as to be co-operable with said abutment means to limit relative axial movement of said connector and said receiving means to provide security of the connection.

2. A connection as claimed in Claim 1, wherein said connector is of dumb-bell shape.

3. A connection as claimed in either Claim 1 or Claim 2, wherein said connector is provided with an extension portion projecting axially from one end thereof and said stop means is fittable to said extension portion.

4. A connection as claimed in Claim 3, wherein said stop means comprises a pin which is so fittable to said extension portion as to stand proud thereof for cooperation with said abutment means.

5. A connection as claimed in Claim 4, wherein said pin is insertable in a diametral hole provided in said extension portion.

6. A connection as claimed in either Claim 4 or Claim 5, wherein both ends of said pin stand proud of said extension portion.

7. A connection as claimed in any one of Claims 4 to 6, wherein said pin comprises a linch-pin, the spring locking clip of which, when in its engaged position, lies snugly adjacent said extension portion.

8. A connection as claimed in any one of Claims 3 to 7, wherein said abutment means comprises a plate having a U-shaped slot which is disposed transversely of said structural members and which is capable of receiving said extension portion during fitting of the connector to said members.

9. A connection as claimed in any one of the preceding claims, wherein said structural

members comprise ramp plates intended for fitment to a conveyor.

10. A structural connection, for connecting together two adjacent structural members, comprising a connector, stop means which can be fitted to said connector, and receiving means, one part of which is formed in or carried by one end portion of one of said structural members and another part of which is formed in or carried by the adjacent end portion of the other of said structural members, one of said parts including abutment means, and said connector and said receiving means being so shaped that the connector can be fitted into said receiving means by:—

- (a) entering it from a side of said structural members with its longitudinal axis at a substantial angle to the lengthwise axis of said structural members so that one end portion thereof is located in one of said parts of said receiving means first,

- (b) sliding the connector still at said angle, or substantially so, in a direction lengthwise of said structural members until a position is reached in which the other end portion of the connector can be entered in the other part of said receiving means,

- (c) sliding the connector axially to a position in which its end portions are both in such registry with connector retention portions of said receiving means that said connector is retained transversely of said members, and,
- (d) fitting said stop means to said connector in such position with respect thereto that it is co-operable with said abutment means to limit relative axial movement of said connector and said receiving means for security of the connection.

11. A connection as claimed in Claim 10, wherein said connector is of dumb-bell shape, the enlarged portions thereof forming the end portions brought into registry with said retention portions.

12. A structural connection substantially as hereinbefore described with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office  
by Burgess & Son (Abingdon) Ltd.—1980.  
Published at The Patent Office, 25 Southampton Buildings,  
London, WC2A 1AY, from which copies may be obtained.